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ABSTRACT

The objectives of this study were (1) to observe and describe the social quality and the cognitive type of spontaneous play exhibited in a group of 20 children in a child care setting during two age periods, toddler (14-30 months) and preschool (30-48 months), and (2) to chart the developmental trends using a model of play complexity derived from the theoretical constructs of Piaget and Parten. Comparisons of sex differences also were made. Observational data were collected on videotape and coded according to sequenced categories of social quality (Onlooking-Solitary, Parallel, Associative, and Cooperative Play) and cognitive type (Practice, Symbolic, and Games). Results supported the sequences outlined by Piaget and Parten, although the amount of associative and cooperative play at older ages was not as great as Parten reported. Play complexity increased as age increased. Social and cognitive complexity both were predicted by chronological age and sex, as was overall complexity. Sex differences were evident for cognitive complexity but not for social complexity. The social quality measure was a more useful predictor of play complexity than the cognitive type measure. (Author/SS)

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Social and Cognitive Complexity in Young Children's Play:

A Longitudinal Analysis

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Abstract

Young children's social and cognitive development is reflected in, and affected by, play behavior. Spontaneous play of children 14–48 months in a group setting was studied. Objectives were: (1) to describe social quality and cognitive type of play, and (2) to chart developmental progression using a two dimensional play complexity model adapted from Piaget and from Parten. Results indicate: (1) category percentages yielding agreement with constructs of the model and revealing linear trends across age levels; (2) sex differences in frequency distribution of play across categories; and (3) significant effects of increasing age on play complexity scores.

Further, cognitive and social development may have a reciprocal hierarchical relationship through the early years. For example, observable higher level cognitive play behavior, such as games, may be dependent on the development of higher level social skills, such as associative and cooperative play, to be expressed.

Social and Cognitive Complexity in Young Children's Play: A Longitudinal Analysis

Young children's social and cognitive development is reflected in and affected by their play behavior. With the proliferation of group care programs for infants and toddlers, investigation of their play behavior in group settings is of major importance. Furthermore, throughout the preschool age span developmental trends in play behaviors which may relate to social and cognitive complexity are in need of study if educational experiences are to be effectively planned to meet developmental needs.

The social quality of young children's play has been sporadically studied over the years, most notably by Parten, in the 30's, and more recently by Barnes; 1971, and Moore, et al, 1974. Interest in play's relationship to early cognitive development has grown primarily from the work of Piaget (1962). Studies concerning the relationship of play to sensorimotor stages have been conducted; for example, Nicholich (1977) found sensorimotor stages, symbolic play, and language to follow a related sequential pattern. Studies which consider both play hierarchies--social quality and cognitive type--have demonstrated relationships between them (Smilansky, 1968; Rubin, et al, 1977).

The present study carries this type of research to an earlier age level, compares longitudinal as well as cross-sectional data and tests the constructs of a theoretical model using social and cognitive complexity dimensions. The theoretical perspective implies that evidence of

increasing higher level and decreasing lower level categories of play behavior can be related to developmental progress. Thus prediction of children's social and cognitive developmental level from knowledge of their play behaviors is theoretically possible. As a corollary, increasing children's participation in and facility with higher level play behaviors might influence social and cognitive development.

Parten stresses the importance of studying the period in which social adjustment to the group is first acquired. Parten (1932) outlined six categories of social play behavior: unoccupied, solitary, onlooking, parallel, associative and cooperative. Her classic work with 2 - 5 year olds indicated that the social quality of play follows a sequence, with solitary and parallel predominating at earlier ages; associative and cooperative becoming predominant in older preschoolers. Barnes (1971) replication of this work showed that preschoolers had less higher level play than Parten reported but that the sequence was similar. If the sequential nature of these play behaviors is also evident with children at toddler age, social quality of play may be a predictor of developmental progress throughout the age span from 14 months to 5 years.

Piaget sees play as the means through which children construct knowledge; thus, spontaneous, child-initiated play which allows active control of the environment serves as a vehicle for intellectual growth. According to Piaget, three types of play can be demonstrated to occur sequentially at different levels of cognitive development, with practice play being predominant in infancy, sympolic play in later preschool years, and games with rules in elementary years.

Rubin, et al, have reported research using a model adapted from Piaget's and Parten's work. They investigated differences in observed play frequencies of various play categories between preschool and kindergarten children and between social classes, considering Parten's play hierarchy and Smilansky's elaboration of Piaget's categories. Their results indicate significant sex and social class differences among preschoolers in social and practice play categories. They point out that in their study, the percentage of associative and cooperative play found in preschoolers was similar to Parten's group (40%) for their middle class sample but similar to Barnes' findings (25%) in their lower class sample. There were, however, significant differences between preschoolers and kindergarteners, with kindergarteners showing more associative and cooperative play and more symbolic play. Girls engaged in more constructive (practice) play and less dramatic (symbolic) play than boys.

The objectives of the present study were (1) to observe and describe the social quality and the cognitive type of spontaneous play exhibited in a group of young children in a child care setting during two age periods: toddler (14-30 months) and preschool (30-48 months) and (2) to chart the developmental trends using a model of play complexity derived from the theoretical constructs of Piaget and Parten. Comparisons of sex differences were also made. A major purpose of the analysis was to test the play complexity model as a predictor of developmental progress in the social and cognitive dimension.

Hypotheses were as follows:

1. The observed play behavior will follow the sequences outlined by Piaget and Parten.
2. There will be greater play complexity at the later age levels.
3. Social and cognitive complexity of play will be predicted by chronological age.
4. There will be sex differences in cognitive complexity and social complexity.
5. Social and cognitive complexity will be equally useful predictors.

Subjects and Settings

Subjects were normally developing children attending the Matthew Lowry Early Childhood Center, Oakland University, observed at two age levels. At age level 1 (14 to 30 months), 39 children (19m, 20f) were observed; at age level 2 (30 to 48 months), 20 of the same children (10m, 10f) who were still in attendance at the Center were observed. Observations on these 20 children form the data base for the longitudinal portion of the study. The Lowry Center has separate day care programs for toddlers and preschoolers. Planned activities provide part of the program for toddlers and preschoolers. Planned activities provide part of the program activities; however, subjects of the study were observed only during free play activity periods when spontaneous, child-initiated play was occurring.

Procedures

Observational data was collected on videotape for 15 minute time blocks on each focal child. Subjects were selected for observation on a randomly determined schedule. Videotaping was done with a Sony portapak unit, which is familiar to children because of regular use in the Center. The videotapes were prepared for analysis by adding an overlay of 1/60 second signal at thirty second intervals on each tape. Observers coded activity at onset of signal according to the categories of social quality (Parten) and cognitive type (Piaget) described in the model. Observers coded cell category directly (Onlooking-Symbolic, Parallel-Practice, etc.) or if no play activity (unoccupied or in transition) was occurring at signal, coded OTHER. A notation AI (adult initiated) was made if play behavior was not the spontaneous choice of the child. Agreement between coders was 82% (79-85 range) at toddler age and 89% (82-95 range) at preschool age.

For each child the total number of observations and of child initiated play observations was complied. Play observation totals were derived by subtracting all observations coded OTHER, which indicated either that child was unoccupied, or in transition, or that a management activity (such as toileting, handwashing, etc.) or problem (such as child bumping head and crying) had occurred. After the countable total was obtained for each child, raw score means were obtained for all categories. Percent frequencies were calculated for each category and complexity scores (social complexity, cognitive complexity, total complexity) were calculated.

The complexity scores are derived from the theoretical model. The categories of social quality of play are given a sequential score based on the social interaction level. A score of one is given to onlooking and solitary because both involve minimal social interaction and a lack of clarity as to the hierarchial level is evident (See Moore et al, 1974). Parallel is scored two; associative, three; and cooperative, four. Similarly, the types of play are sequentially scored with practice being scores, one; symbolic, two; and games with rules, three. The scoring model and examples which fall in the categories are shown in the Complexity Model below. The complexity score for each cell is derived by mutliplying the social quality scores by the cognitive scores. For example, solitary symbolic is scored two (1 x 2) and associative practice is scored three (3 x 1).

Complexity Model

Social Quality of Play (Parten's Categories)	Practice(1)	Symbolic(2)	Games (3)
Onlooking (1)			
Solitary (1)			
Parallel (2)			
Associative (3)			
Cooperative (4)			

Cognitive Type of Play (Piaget's Categories)

The percentages were based on all possible observations and were used as the dependent variable in the categorical ANOVA's. The complexity scores were used in the regression analysis and in the Age 1 and 2 longitudinal ANOVA's.

Results

At age level 1, solitary (31.2%) and parallel (22.6%) play predominate in the social dimension while practice (53%) is predominant and symbolic secondary (12.2%) in the cognitive dimension. The most common type of play is solitary practice, with parallel practice a close second. The largest proportion of symbolic play is at the solitary level. Table I shows mean percent category frequencies for both age levels.

Boys and girls show somewhat different patterns. For girls, parallel play predominates, while for boys solitary predominates. About an equal percentage (6-7%) is in the associative social quality dimension. Boys and girls have similar percentages of symbolic play while girls engage in more practice play than boys.

A Chi square was done on the percentages of play observations per category to determine if there was a significant difference demonstrated between the play of boys and girls as represented in the social play and cognitive type of play categories. The observed play as characterized by Piaget's type of play categories yielded a Chi square of 43.9 (2 df) which is significant at the .001 level. When Parten's social quality categories are used to classify observed play instances a Chi square of 50.28 (4 df) is obtained which is also significant at the .001

level. Thus significant differences in the distribution of spontaneous play over both sets of categories are exhibited by boys and girls.

At age level 2, solitary play had decreased (from 31.2% to 16.7%) while parallel increased slightly (from 22.6% to 30.6%). Increases in associative and cooperative play were evident with associative going from 6.5% to 10.9% and cooperative from 1.9% to 9.1%. Practice play decreased (from 53% to 44.2%), while symbolic increased (from 12.2% to 32.3%). Onlooking also increased slightly (from 9.4% to 12.8%).

Boys and girls again showed different distributions in the increases. For girls, solitary play decreased while parallel and cooperative increased. For boys, solitary also decreased but major increases occurred in parallel and associative play. Both boys and girls decreased slightly in practice play and increased to a greater extent in symbolic. Chi square analysis showed a significant difference in boys' and girls' distribution of social play (63.55 $p < .001$) (4df) and also a significant difference in cognitive type of play. (22.31 $p < .001$) (2df) Content analysis of activities showed boys having a wider range of activities in symbolic and practice play (10-12 boys, 6-8 for girls). Table 3 gives percents by age level and sex.

A series of 2 (age) X 2 (sex) ANOVA's were conducted for each of the social and cognitive categories. Percentages for all play categories are in Table 1. Significant differences were found for symbolic play between the two age levels ($p \leq .02$) and for solitary play for age levels ($p \leq .02$) and sex ($p \leq .01$). A trend toward

significance was found between the sexes on the parallel play dimension ($p \leq .03$). Because of the multiple tests a p value of .03 was considered only as a trend toward significance.

Complexity scores at the two age levels yielded a correlation of .35 which is not significant. Neither social complexity (.32) nor cognitive complexity (.09) were related at the two age levels. Thus, although the group as a whole showed differences in the complexity at the two age levels, individual children's scores at one age were not predictive of their scores at the other age. Therefore, for purposes of trend analysis the groups were considered as independent. Analysis of data collected on different children at each level will be necessary to further test the significance of the reported trends.

Correlation analyses of trends across all ages by months of age and complexity indicated that overall social complexity increases with increasing age ($r= .46$, $p <.001$) Cognitive complexity shows a trend in that direction ($r= .20$, $p < .11$). Solitary play decreases with increasing age ($r= .35$, $p < .02$) and symbolic play increases ($r= .40$, $p <.02$). A trend toward decreasing practice play with increasing age is also evident ($r= -.26$, $p = .056$). The overall complexity of play increased with increasing age ($r= .41$, $p <.004$).

When age level II was analyzed separately, cognitive complexity was significantly related to increasing age ($r= .40$, $p <.038$). Social complexity showed a significant relationship to increasing age ($r= .39$, $p < .045$) as did overall complexity ($r= .47$, $p <.018$). Age level I alone showed no significant trends. Table 2 gives mean complexity

scores at the two age levels. Figures 1, 2, 3, show trends across the two age levels.

Regression analysis to determine whether age in months (as an approximation of developmental age) could be predicted by sex and complexity score showed a significant trend. ($F = 4.948$, df 2.37). Similarly overall complexity could be predicted by sex and age in months ($F = 4.293$, df 2.37) as could social complexity ($F = 5.261$, df 2.37) and cognitive complexity ($F = 3.609$, df 2.37). Examination of F statistics for the two predictor variables shows that age in months accounts for the prediction in social and overall complexity; sex accounts for most of the prediction in cognitive complexity.

Results by Hypothesis

Thus, hypothesis of the study were as follows:

1. The sequences outlined by Piaget and Parten were supported, although amount of associative and cooperative play at older ages was not as great as Parten reported.
2. Play complexity increased as age increased.
3. Social and cognitive complexity are both predicted by chronological age, and sex as is overall complexity.
4. Sex differences in cognitive complexity are evident but there are no significant sex differences in social complexity.
5. Social complexity was a more useful predictor.

Discussion

The results of the present study indicate that increasing social and cognitive complexity of play is exhibited over time. Children at toddler age exhibited significantly less symbolic play and significantly more solitary play than the same children exhibited at preschool age. Other categories of play - onlooking, parallel, associative, and cooperative, practice and games were not significantly different although children did decrease in parallel play with age. The data thus supports the hierarchical nature of the categories defined by Piaget and Parten but indicates agreement with Barnes in that associative and cooperative play were not seen at high levels in preschoolers. They did not increase enough to be significantly greater at the preschool age level than at toddler age level.

The complexity model as a theoretical construct seemed to be a useful measure of charting developmental progress and for predicting play complexity on the basis of increasing age. The social complexity dimension, however, was the major component in prediction. Therefore, social quality of children's play may be the earliest indicator of developmental progress in the group setting. Cognitive complexity was less strong as a predictor. This is probably due to the age range studied, which has relatively few instances of spontaneous game behavior recorded. If the age range of children is extended to kindergarten and early elementary, cognitive complexity would probably be a stronger component. Thus findings, are generally in agreement with the work of

others in the field but indicate that at toddler age the range of play behaivors shows a narrower, and more varied pattern.

Differences in the sexes in terms of categories of play engaged in support other studies which report early sex differentiation in play. Sex differences in play patterns were found in the social and the cognitive areas at both toddler and preschool age levels. Toddler and preschool age girls engaged in more practice play, as in Rubin's study which found preschool age girls engaging in more constructive play than preschool age boys. The difference in symbolic play between boys and girls also appears to be developing in a direction consistent with Rubin's findings. Percentages of symbolic play by boys and girls at age level one are very similar (13.4% boys, 11% girls). By age level two the difference has grown to 36.3% for boys and 28.2% for girls. At the early age level parallel play in girls and solitary play in boys was highest. At the later age an increase was seen in cooperative for girls and associative for boys. Type of activities also showed differences which support early stereotypic sex role identity.

Onlooking behavior did not decrease with age; in fact, a slight increase occurred. It may be that onlooking behavior is a stable characteristic with children exhibiting consistent levels of onlooking across age levels or that characteristics of the setting in which the study was conducted influenced onlooking behavior. The environment includes many novel experiences and variable scheduling.

It may be that indeed preschool children today engage in less associative and cooperative play than children in the thirties. The

subjects in the present study were middle class children and the percent of associative and cooperative totaled 20% at preschool level. Only further study will determine if this was due to characteristics of setting or to children's developmental level. The environment, in which small stable groups and static relationships over long time periods are less likely to occur than in many preschool settings, may make associative and cooperative play less frequent. Cooperative play especially needs group stability.

Solitary play showed a decrease which agrees with Parten's findings. Moore, et al argues that solitary play is a higher level activity in the school setting and therefore should be expected to be a large component of play activity. This may be true for the setting they studied. The present data does not support that conclusion, however. The major developmental trend evident in this study was increasing social complexity rather than increasing cognitive complexity.

Observeable higher level cognitive play behavior may depend on the development of higher level social skills to be fully expressed. For example, it seems likely that children must develop to the associative or cooperative level in social quality before the game category of cognitive type becomes a major play characteristic. Therefore, cognitive and social development may have a reciprocal hierarchical relationship through the early childhood years. The relationships and sequence might also differ for boys and girls.

In summary, the study gives support to the sequential nature of the categories of social quality and cognitive type identified by

Parten and by Piaget. As age level increases, play behavior changes in the directions predicted by their work. The data on sex differences is less clear. Apparently overall complexity of play may not differ for boys and girls but the activities which make up the complexity dimensions may show variations.

The present research provides only a first step of study of the longitudinal trends in social and cognitive complexity of play. It provides evidence, however, that attention to young children's level of play has implications for charting developmental progress and planning appropriate educational experiences.

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Table I

Mean Percent Category Frequency

	Age Level I (14-30 months)	Age Level II (30-48 months)
Social Quality		
Solitary	31.2	16.7
Onlooking	9.4	12.8
Parallel	22.6	30.6
Associative	6.5	10.9
Cooperative	1.9	9.1
Cognitive Type		
Practice	53.0	44.2
Symbolic	12.2	32.3
Games	6.1	3.8

Table 2

Mean Complexity Scores

	Age Level I	Age Level II
Social (SP)	1.5	1.95
Cognitive (PP)	1.4	1.5
Total (CP)	2.2	2.9

Table 3

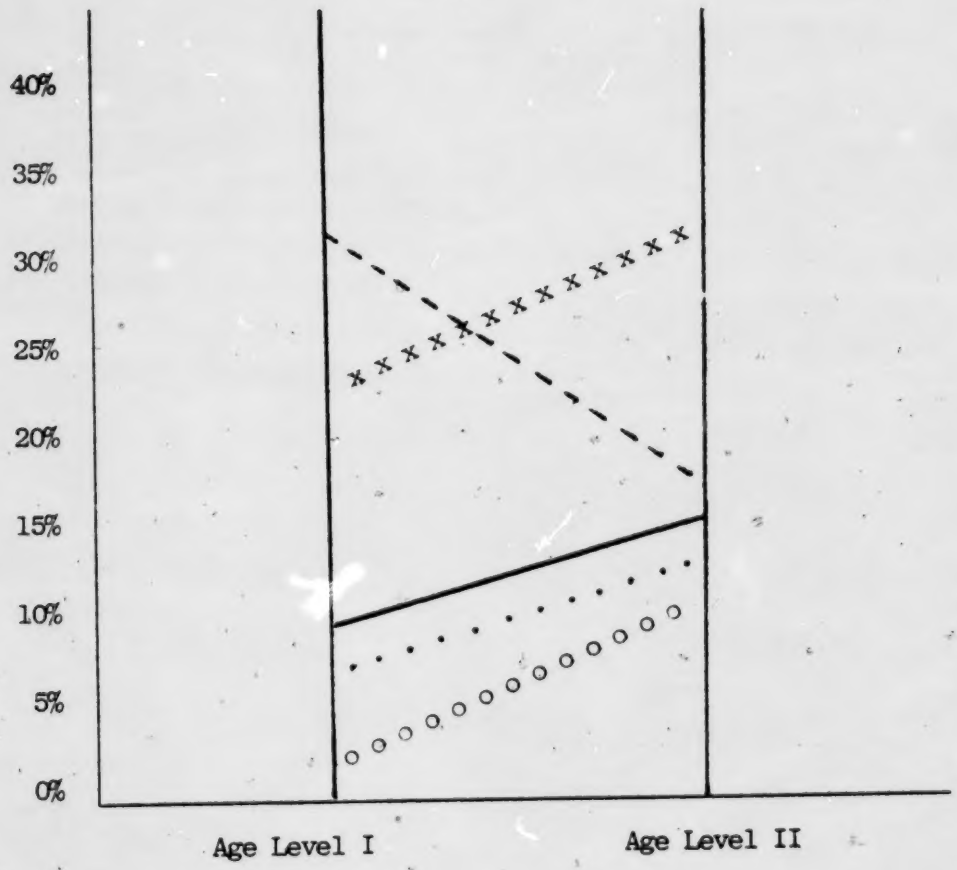
Percent of Play in Social and Cognitive Categories

By Age Level and Sex

	Age 1		Age 2	
	M	F	M	F
Onlooking	8.7	10.2	13.2	11.9
Solitary	39.3	23.1	24.6	8.9
Parallel	13.9	31.2	21.3	39.3
Associative	6.1	6.8	15.7	6.2
Cooperative	3.9	0	4.1	14.1
Practice	48.0	58.8	40.6	47.8
Symbolic	13.4	11.0	36.3	28.2
Games	10.4	1.6	3.1	4.5

Figure I

Trends in Category Frequency



Figures 2

Trends in Category Frequency

Cognitive Type

Practice - - - - - - -

Symbolic _____

Games . . . . . .

Figure 3

Trends in Mean Complexity